



Application Number: 09/557,696

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Attorney Docket No.: 2950.09US02

Bi et al.

Confirmation No.: 8550

Application No.: 09/557,696

Examiner: B. R. Gordon

Filed: April 25, 2000

Group Art Unit: 1743

For: COMBINATORIAL CHEMICAL SYNTHESIS

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APPEAL BRIEF FOR APPELANTS

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
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Sir:

This is an appeal from an Office Action dated November 18, 2003, in which claims 1-14, 38-54, 56-61 and 63 were finally rejected. Applicants appeal the rejection of these claims. A Notice of Appeal was filed on March 18, 2004.

REAL PARTY IN INTEREST

NanoGram Corporation, a corporation organized under the laws of the state of Delaware, and having offices at 2911 Zanker Road, San Jose, California, has acquired the entire right, title and interest in and to the invention, the application, and any and all patents to be obtained therefore, as per the Assignment, recorded at Reel 010934, Frame 0075 from the inventors to NeoPhotonics Corporation and an assignment from NeoPhotonics Corporation to NanoGram Corporation, recorded at Reel 013957, Frame 0076. Note that NeoPhotonics Corporation was formerly called NanoGram Corporation, and the present NanoGram Corporation was previously a wholly owned subsidiary of NeoPhotonics

Corporation following the formal name change. The present NanoGram Corporation is now an independent corporation, but affiliated with the earlier NanoGram Corporation, now named NeoPhotonics Corporation.

#### RELATED APPEALS AND INTERFERENCES

NanoGram Corporation has several other patent applications on appeal. However, none of the other pending appeals relates to the subject matter of the present appeal.

#### STATUS OF THE CLAIMS

Claims 64-68 have been allowed. The Examiner indicated that claims 8, 9, 11, 45-52, 55 and 62 are objected to for depending from a rejected base claim and would be otherwise allowable. Applicants believe that this is incorrect or inconsistent since claim 1 stands rejected under 35 U.S.C. § 112 and since claims 8, 9, 11, 45-52 depend directly or indirectly from claim 1. Thus, claims 1-14, 38-54, 56-61 and 63 stand rejected, while claims 55 and 62 are allowable. The pending claims are listed in Appendix 1.

#### STATUS OF AMENDMENTS

The Amendment After Final filed on February 18, 2004 was entered with the filing of this Appeal according to Advisory Action of March 31, 2004. Thus, all Amendments have been entered.

#### SUMMARY OF INVENTION

The present invention is mainly directed to the performance of combinatorial chemistry techniques to composition formation, such as a powder, within a reactive flow. Traditional combinatorial chemistry is performed in fixed reactive media, such as solutions. For example, this traditional approach can use trays with wells that provide for a number of small volume reactions. In contrast, Applicants approach is based on a methodology in

which reactants are flowed from a nozzle and reacted within the flow. Then, the product materials can be separately collected. These approaches are particularly effective for the productions of powders, such as inorganic powders, in a combinatorial chemistry environment. The present approaches offer advantages with respect to the capability of forming different materials than available through other approaches and for the capability of selectively adjusting the quantities of materials produced such that larger quantities can be produced if needed for evaluation.

In some embodiments, the combinatorial chemistry approach takes particular advantage of laser pyrolysis techniques advanced by the present assignee. These laser pyrolysis approaches advance early academic and industrial work in the field to a sophisticated commercial approach. These commercial laser pyrolysis approaches are the subject of several patents, such as U.S. 5,958,348 - Efficient Production Of Particle By Chemical Reaction, U.S. 6,193,936 - Reactant Delivery Apparatuses, 6,248,216 - Efficient Production Of Particles By Chemical Reaction, U.S. 6,482,374 - Methods For Producing Lithium Metal Oxide Particles, U.S. 6,508,855 - Reactant Delivery Apparatuses, and U.S. 6,680,041 - Reaction Methods For Producing Metal Oxide Particles.

With respect to claim 1, this claim involves the motion of a reactant inlet nozzle relative to a plurality of collectors in which different product materials are produced in the flow directed to different collectors. The relative motion can be obtained by moving the nozzle relative to an array of collectors (see for example Fig. 3) or by moving the array of collectors relative to a fixed nozzle (see for example Figs. 9 and 10). In some embodiments, the nozzle and collector are capable of motion. See, for example, Fig. 4. Thus, the combinatorial synthesis is performed in the reactive flow with different collectors used to collect the different products.

With respect to claim 58, this claim does not require movement of a nozzle or collectors. Thus, a plurality of nozzles and collectors could be used to perform the

synthesis. However, claim 58 differs with respect to the nature of the reactant delivery system that forms the reactant flows that drive the combinatorial synthesis. Specifically, claim 58 specifies that the reactant delivery system comprises a first quantity of fluid reactants and a second quantity of fluid reactants being different from the first quantity of fluid reactants. Most, if not all, of the reactant delivery apparatuses described in Applicants' specification involve a suitable reactant delivery apparatus for the practice of this claimed method.

Claims 64-68 have been allowed and relate to additional approaches for performing combinatorial synthesis with flowing reactants.

In contrast with the combinatorial chemistry approaches of the other claims, claim 38 and claims depending from claim 38 are directed to methods for producing mixtures of compositions. The compositions are synthesized sequentially within a reactive flow.

#### ISSUES

1. Whether claims 1-14 and 39-52 are indefinite under 35 U.S.C. § 112, second paragraph.
2. Whether claims 38, 53, 54, 56-60 and 63 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent 4,649,037 to Marsh et al.?
3. Whether claims 1-7, 10, 12-14, 39-44 and 61 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent 4,649,037 to Marsh et al. in view of U.S. Patent 6,254,826 to Acosta et al.?

#### GROUPING OF CLAIMS

1. Claims 1, 6, 7, 10, 14, and 41-44 form a first claim group directed to a first method for obtaining a plurality of quantities of a composition.
2. Claim 2 forms a second claim group directed to a method for obtaining a plurality of compound wherein the reactants differ.

3. Claims 3 and 4 form a third claim group directed to a method for obtaining a plurality of compounds wherein the reactions conditions differ.
4. Claim 5 forms a fourth claim group directed to a method for obtaining a plurality of compounds wherein the nozzle comprises a plurality of reactant inlets.
5. Claim 12 forms a fifth claim group directed to a method for obtaining a plurality of compounds wherein the properties of the product compositions are evaluated.
6. Claim 13 forms a sixth claim group directed to a method for obtaining a plurality of compounds wherein the reactants from a plurality of reactant inlets combine for introduction into a reaction zone.
7. Claims 38-40 form a seventh claim group directed to a method for producing a mixture of compositions.
8. Claim 53 forms an eighth claim group directed to a method for producing a mixture of compositions wherein the composition of reactants differ from each other.
9. Claim 57 forms a ninth claim group directed to a method for producing a mixture of compositions wherein the properties of the mixture are evaluated.
10. Claims 58 and 61 form a tenth claim group directed to a method for obtaining a plurality of quantities of compositions.
11. Claim 59 forms a eleventh claim group directed to a method for obtaining a plurality of quantities of compositions where two quantities of fluid reactants differ in proportion of the reactants.
12. Claim 60 forms a twelfth claim group directed to a method for obtaining a plurality of quantities of compositions wherein different reactants comprises different compounds.
13. Claim 61 forms a thirteenth claim group directed to a method for obtaining a plurality of quantities of compositions wherein a nozzle moves relative to a plurality of collectors.

14. Claim 63 forms a fourteenth claim group directed to a method for obtaining a plurality of quantities of compositions wherein the properties of the compositions are evaluated.

## ARGUMENT

### I. **LEGAL BACKGROUND**

The Court of Appeals for the Federal Circuit has exclusive appellate jurisdiction for cases arising under the patent law under 28 U.S.C. § 1295 (a)(1). The Federal Circuit has adopted as binding precedent all holding of its predecessor courts, the U.S. Court of Claims and the U.S. Court of Customs and Patent Appeals. South Corp. v. U.S., 215 USPQ 657 (Fed. Cir. 1982). Therefore, unless they have been overruled en banc, CCPA cases are binding precedent for the present appeal.

#### A. INDEFINITENESS

The patent statute at 35 U.S.C. § 112, second paragraph, requires that the "specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." "Whether a claim is invalid for indefiniteness requires a determination whether those skilled in the art would understand what is claimed when the claim is read in light of the specification." Morton International Inc. v. Cardinal Chemical Co., 28 USPQ2d 1190, 1194 (Fed. Cir. 1993).

"The legal standard for definiteness is whether a claim reasonably apprises those of skill in the art of its scope. See *Amgen Inc. v. Chugai Pharmaceutical Co. Ltd.*, 927 F.2d 1200, 1217, 18 USPQ2d 1016, 1030 (Fed. Cir.), *cert. denied sub nom., Genetics Inst., Inc. v. Amgen, Inc.*, 112 S.Ct. 169 (1991) (citing *Shatterproof Glass Corp. v. Libby-Owens Ford Co.*, 758 F.2d 613, 624, 225 USPQ 634, 641 (Fed. Cir. 1985)). The ultimate

conclusion of indefiniteness is one of law, which we are free to review anew on appeal."  
In re Warmerdam, 31 USPQ2d 1754, 1759 (Fed. Cir. 1994)(concluding citation omitted).

### C. OBVIOUSNESS

#### 1. The Examiner bears the burden of demonstrating nonobviousness.

The Applicants note that the patent office has the burden of persuasion in showing that the Applicants are not entitled to a patent. "[T]he conclusion of obviousness vel non is based on the preponderance of evidence and argument in the record." In re Oetiker, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). The patent office has the ultimate burden of persuasion in establishing that an applicant is not entitled to a patent. Id. at 1447, concurring opinion of Judge Plager. "**The only determinative issue is whether the record as a whole supports the legal conclusion that the invention would have been obvious.**" Id.

"In rejecting claims under 35 U.S.C. §103, the examiner bears the initial burden of presenting a prima facie case of obviousness." In re Rijckaert, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). Prima facie obviousness is not established if **all the elements** of the rejected claim are not disclosed or suggested in the cited art. In re Ochiai, 37 USPQ 1127, 1131 (Fed. Cir. 1995). ("The test for obviousness *vel non* is statutory. It requires that one compare the claim's 'subject matter as a whole' with the prior art 'to which said subject matter pertains.'"). See also, MPEP 2143.03 "All Claim Limitations Must Be Taught or Suggested," citing In re Royka, 180 USPQ 580 (CCPA 1974). "It is impermissible, however, to simply engage in a hindsight reconstruction of the claimed invention, using applicant's structure as a template and selecting elements from references to fill the gaps." In re Gorman, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991).

If the Examiner fails to establish a prima facie case of obviousness, the obviousness rejection must be withdrawn as a matter of law. In re Ochiai, 37 USPQ at 1131 ("When the references cited by the examiner fail to establish a prima facie case of obviousness, the rejection is improper and will be overturned.").

2. There Must Be Motivation In The Art To Modify The Teachings Of the Cited References

The motivation, or suggestion, to combine references must be either explicitly or implicitly in the references or knowledge "generally available to one of ordinary skill in the art." See, MPEP § 2143.01. Furthermore, "[t]he test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." See, MPEP §2143.01 (quoting *In re Kotzab*, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000)).

The Federal Circuit has provided considerable guidance on establishing obviousness of a claim based on a combination of references. "Our case law makes clear that the best defense against hindsight-based obviousness analysis is the rigorous application of the requirement of a teaching or motivation to combine the prior art references." *Ecolochem Inc. v. Southern Edison*, 56 USPQ2d 1065, 1073 (Fed. Cir. 2000). "Therefore, '[w]hen determining the patentability of a claimed invention which combines two known elements, 'the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.' " *Id.* (quoting *In re Beattie*, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992)(quoting *Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick Co.*, 221 USPQ 481, 488 (Fed. Cir. 1984))). "In order to prevent a hindsight-based obviousness analysis, we have clearly established that the relevant inquiry for determining the scope and content of the prior art is whether there is a reason, suggestion, or motivation in the prior art or elsewhere that would have led one of ordinary skill in the art to combine the references." *Ruiz v. A.B. Chance Co.*, 57 USPQ2d 1161, 1167 (Fed. Cir. 2000). "The test is not whether one device can be an appropriate substitute for another." *Id.* In *Ruiz*, the Federal Circuit overturned a district court holding that "it

would have been obvious to combine screw anchors and metal brackets, because the need for a bracket 'was apparent.'" *Id.*

When the modification of an apparatus renders the apparatus "**inoperative for its intended purpose**," the reference teaches away from the suggested modification. In re Gordon, 221 USPQ 1125, 1127 (Fed. Cir. 1984)(emphasis added). "If when combined, the references 'would produce a seemingly inoperative device,' then they teach away from their combination." Tec Air Inc. v. Denso Manufacturing Michigan Inc., 52 USPQ2d 1294, 1298 (Fed. Cir. 1999)(citing In re Sponnoble, 160 USPQ 237, 244 (CCPA 1969)).

### 3. The References Must Provide A Reasonable Expectation Of Success

While a reference is prior art for all that it teaches, references along with the knowledge of a person of ordinary skill in the art must be enabling to place the invention in the hands of the public. In re Paulsen, 31 USPQ2d 1671, 1675 (Fed. Cir. 1994). See also In re Donohue, 226 USPQ 619, 621 (Fed. Cir. 1985). "The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood success, viewed in light of the prior art." Micro Chemical Inc. v. Great Plains Chemical Co., 41 USPQ2d 1238, 1245 (Fed. Cir. 1997)(quoting In Re Dow Chemical Co., 5 USPQ2d 1529, 1531 (Fed. Cir. 1988)).

### 4. The References Must Teach Or Suggest All Of The Claim Elements

"To establish prima facie obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art." MPEP 2143.03.

### 5. Obviousness Over A Single Prior Art Reference

The importance of the principle that the prior art itself must suggest the motivation to modify the teachings of a reference was eloquently stated in In re Rouffet, 47 USPQ2d 1453, 1458 (Fed. Cir. 1998)(emphasis added):

The Board did not, however, explain what specific understanding or technical principle within the knowledge of one of ordinary skill in the art would have suggested the combination. **Instead the board merely invoked the high level of skill in the field of the art. If such a rote invocation could suffice to supply a motivation to combine, the more sophisticated scientific fields would rarely, if ever, experience a patentable technical advance.** Instead, in complex scientific fields, the Board could routinely identify the prior art elements in an application, invoke the lofty level of skill, and rest its case for rejection. **To counter this potential weakness in the obviousness construct, the suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.**

Similar principles must be applied when obviousness is based on the teachings of a single cited reference.

In appropriate circumstances, a single prior art reference can render a claim obvious. However, there must be a showing of a suggestion or motivation to modify the teachings of that reference to the claimed invention in order to support the obviousness conclusion. This suggestion or motivation may be derived from the prior art reference itself, from the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved. **Determining whether there is a suggestion or motivation to modify a prior art reference is one aspect of determining the scope and content of the prior art, a fact question subsidiary to the ultimate conclusion of obviousness.**

Sibia Neurosciences, Inc. v. Cadus Pharmaceutical Corp., 55 USPQ2d 1927, 1931 (Fed. Circuit 2000)(internal citations omitted, emphasis added).

## II. ANALYSIS - INDEFINITENESS REJECTION

The Examiner rejected claim 1 under 35 U.S.C. § 112, first paragraph as being indefinite. The Examiner asserts that the language of claim 1 "along a flow path independent" is some attempt to "add a structural limitation." See page 6 of the final Office

Action. For some unknown reason, the Examiner is apparently trying to read too much into the claim. Applicants maintain that the language of the claim is clear and definite.

With all due respect, it is not clear to Applicants how the words selected by the Examiner are indefinite. Applicants point out that this is a METHOD claim not an apparatus claim. Applicants further point out that the Examiner is also evaluating the patentability over the prior art using some perplexing evaluation of the apparatus corresponding to claim 1 rather than the claimed method, as noted in the obviousness analysis below. Since claim 1 is a **method** claim, the **proper approach to specify features** involve how things are done and not with what apparatus they are done. Words in claims generally take on their ordinary meaning, and that is the intent here.

The entire step in question states "collecting the second quantity of product composition from the fluid stream using a second collector along a flow path independent from the first collector." This does not say anything mysterious. The previous step describes the production of a second quantity of product composition in a flow. By stating that the flow path for the second quantity of product is independent from the first collector, it is clear that the flow with the second quantity of product does not flow though the first collector. What is unclear? There is a flow, and this flow does not flow through the first collector. It is as simple as this. Such a flow pattern does influence acceptable apparatuses, but a particular apparatus structure certainly is not required to practice the claimed method or to make the method clear. A range of apparatuses can be used to practice this methodology.

In the Advisory Action, the Examiner pointed to Applicants' argument over obviousness in the previous response that stated "With one reactant inlet and two independent collectors used in series (i.e., sequentially in time), different flow paths are used to direct the different collectors for sequential collection." This use of the term "series" is indicated explicitly in this sentence as relating **to time** and **not** to position. Nevertheless, the Examiner uses this statement to argue that the nature of the apparatus is not clear. The claim

is a method claim, and the method steps are clear. That is all that is expected and certainly all that is required under the statutory scheme.

Applicants maintain that this simple language is clear and definite. A case of prima facie indefiniteness clearly has not been established. Thus, the rejection should be withdrawn.

### III. ANALYSIS - REJECTION OVER MARSH ET AL.

The Examiner rejected claims 38, 53, 54, 56-60 and 63 under 35 U.S.C. § 103(a) as anticipated by U.S. Patent 4,649,037 to Marsh et al. (the Marsh patent, Appendix 2). The Examiner asserted that the Marsh patent discloses "a method in which inorganic metal oxides having high surface area and pore volume are prepared by spray drying." Moreover, the Examiner asserted that "[d]ifferent reactants may be added to the stream admixture (solution or gel) in order to produce a product of different properties." Furthermore, at page 4 of the final Office Action with respect to claim 38, the Examiner asserted that "the claim is much broader than the remaining independent claims" in that a particular cooking operation could fall within the claim. With all due respect, neither the Marsh patent nor the Examiner's anecdotal cooking process render Applicants' claimed invention prima facie obvious, as described in detail in the following. Since the Examiner has not met his burden, the rejection should be withdrawn.

#### Claim 38

At page 9 of the Office Action, the Examiner asserts that the Marsh et al. patent does not comprise a plurality of collectors, but that "it would have been obvious to one of ordinary skill in the art to recognize that in varying the reactants of the system different collectors or containers would be necessary to collect the different products from outlet 20 of the system in order to avoid mixing the products or cross contamination." First, such a teaching is not suggested or motivated by the Marsh patent. Second, this is besides the point. **The Examiner asserts that the motivation is to avoid mixing, but claim 38 is**

**directed to a single collector that is specifically used to form a mixture.** With all due respect, the Examiner seems to be rejecting claim 38 as if it were depending from claim 58. Unfortunately, the avoidance of forming a mixture is not relevant to the claimed invention in claim 38.

With respect to the Examiner's cooking analogy, claim 38 states that "the **reactions** are performed in a reaction chamber sealed from the ambient environment." As claimed, the reactions are performed sequentially with a single collector. Thus, it is clear that the reaction chamber remains sealed through the sequential process, or the **reactions** are not performed in a sealed reaction chamber. Any other interpretation is not reasonable. Thus, the claim is distinguished from the Examiner's cooking analogy.

Applicants do not see any statutory basis to reject the claim. The Examiner's assertions that the claim is in some ways broader than the other independent claims does not seem like a statutory basis to reject the claim. Thus, the rejection should be withdrawn.

#### Claim 53

Claim 53 further involves the use of different reactants to form the different compositions used to form a mixture. The Marsh patent does not teach or suggest using different reactants to form different compositions that are collected together. Therefore, the Marsh patent clearly does not render claim 53 prima facie obvious.

#### Claim 57

Claim 57 is directed to further evaluation of the product material. The Examiner has not asserted that such a feature is taught or suggested by the Marsh patent. Therefore, the Marsh patent clearly does not render claim 57 prima facie obvious.

#### Claim 58

With respect to independent claim 58, there are some notable differences from the teachings of the Marsh patent. The Examiner asserts that the Marsh patent does not teach a plurality of collectors. This is incorrect. The Marsh patent teaches three collectors 9, 19 and 23 in spatial series. (Applicants' description of the collectors being used in **temporal** series

as used in the claimed method has unfortunately caused confusion with respect to the structure of the collector apparatus, which is not specified in Applicants' claim.) However, the Marsh patent does not teach a reactant system that comprises a first quantity of fluid reactants and a second quantity of fluid reactants different from the first quantity of fluid reactants or the sequential in time delivery of these reactants for reaction. These fluid reactants are then reacted sequentially in time as specified in the explicit method steps.

The Marsh patent discloses a single feed 1 and the reaction of this feed. The Marsh patent does not teach, suggest or motivate such a reactant delivery system as claimed and the corresponding sequential in time reaction scheme, as claimed. On page 3, of the Final Rejection, the Examiner states that the "fluids may be placed sequentially in the same reservoir supply (source) flow through the same system to a reactor for mixing." This assertion is not consistent with the claim since then **the reactant delivery system never comprises the two different reactants**, as claimed by Applicants. This structure of the reactant delivery system does affect how the claimed method is carried out and the corresponding patentability even though this is a method claim. Furthermore, the Marsh patent does not suggest or motivate such a modification as suggested by the Examiner without hindsight based on Applicants' own invention. Therefore, the Marsh patent does not render claim 58 prima facie obvious.

#### Claim 59

Claim 59 is directed to the first quantity of fluid reactants comprising different proportions of compounds relative to the second quantity of fluid reactants. The Marsh patent clearly does not teach, suggest or motivate the different quantities of reactants having different proportions of compounds. The Examiner has not asserted that the Marsh patent teaches or motivates such a reaction delivery systems. Therefore, the Marsh patent clearly does not render claim 59 prima facie obvious.

Claim 60

Claim 60 is directed to the first quantity of fluid reactants comprising different compounds than the second quantity of fluid reactants. The Examiner has not asserted that the Marsh patent discloses such a reactant delivery system, and the Marsh patent does not suggest or motivate such a reactant delivery systems. Therefore, the Marsh patent clearly does not render claim 60 prima facie obvious.

Claim 63

Claim 63 is directed to the further evaluation of both the first quantity of product composition and the second quantity of product composition. The Examiner has not asserted that the Marsh patent suggests or motivates these evaluations. The Marsh patent clearly does not render claim 63 prima facie obvious.

Summary

Since the Marsh patent does not render any of claims 38, 53, 54, 56-60 and 63 prima facie obvious, the rejection of these claims over the Marsh patent should be withdrawn.

**IV. ANALYSIS - REJECTION OVER MARSH ET AL. AND ACOSTA ET AL.**

The Examiner rejected claims 1-7, 10, 12-14, 39-44 and 61 under 35 U.S.C. § 103(a) as being obvious over the Marsh patent in view of U.S. Patent 6,254,826 to Acosta et al. (the Acosta patent, Appendix 3). These claims are discussed in view of the particular claim groupings.

Claims 1, 6, 7, 10, 14 and 41-44

These are method claims. However, the Examiner seems to focus repeatedly on the structure of an apparatus. If the Marsh apparatus is used to perform a new method, the new method could certainly be patentable over the Marsh patent. It is not clear whether or not the Marsh apparatus could be adapted to practice the claimed invention, but this is **irrelevant**. At page 9 of the final Office Action, the Examiner cited the Acosta patent for disclosing "multiple conduits (inlets and outlets) substance transfer device, and

substance transfer positioning structure." The Examiner continues by describing other particular **structures** in the Acosta patent. The Examiner concludes by stating (emphasis added) that it "would be obvious to one of ordinary skill in the art to modify the **device** of Marsh by incorporating the transfer device of Acosta in order to supply the multiple reactants or substances to the drying chamber (reaction chamber) of Marsh et al. in order to avoid the cross-contamination that may occur when using a common supply for different reactants." The Examiner does not state what the shortcomings of the Marsh patent are with respect to the claimed **method** in a Graham analysis, and how the Acosta patent **motivates** the modifications with respect to Applicants' claimed method. Thus, with all due respect, the Examiner failed to assert anything resembling a prima facie case of obviousness.

There is little, if any, motivation to combine the teachings of the Marsh patent relating to inorganic powder formation with the teachings of the Acosta patent relating to assay of biological samples under any circumstances since they are essentially non-analogous art. It is not at all clear how one would modify the methods of the Marsh patent relating to powder formation based on teaching relating to performing biological assays. Presumably, this analysis of the Office Action is based on hindsight, but since the analysis is focused on some apparatus rather than the method, there is no argument to refute. The combined teachings of the Marsh patent and the Acosta patent simply do not teach, suggest or motivate a **method** involving reacting different reactant streams from a single nozzle and directing the different products to different collectors. Therefore, the combined teachings clearly do not come close to rendering Applicants' claimed invention prima facie obvious.

#### Claim 2

Claim 2 is directed to the method wherein the first quantity of fluid reactant is different from the second quantity of fluid reactants. The Examiner has not asserted that

this is taught, suggested or motivated by the references. Therefore, prima facie obviousness has not been established.

Claims 3 and 4

Claims 3 and 4 are directed to methods in which the reaction conditions during the reaction of the first fluid reactants are different from the reaction conditions during the reaction of the second fluid reactants. The Examiner did not assert that the combined teachings of the cited references taught, suggested or motivated this variation in reaction conditions in the context of the claimed methodology. Therefore, prima facie obviousness has not been established.

Claim 5

Claim 5 is directed to a nozzle directing reactants comprising a plurality of reactant inlets. Applicants note that the Marsh patent teaches a single reactant inlet 11 with a distinct nitrogen purge, which does not involve a reactant. The Examiner has not explained how the analysis system of the Acosta patent can be effectively used in the methodology of the Marsh reaction system. The teachings simply do not provide a reasonable expectation of success or even any reasonable teachings on how to combine the apparatuses. The combined teachings do not render Applicants' claimed invention prima facie obvious.

Claim 12

Claim 12 is directed to the further evaluation of the properties of the resultant product compositions. The Examiner has not asserted that the cited references teach, suggest or motivate the further evaluation of the product materials. Therefore, prima facie obviousness has not been established.

Claim 13

Claim 13 is directed to the introduction of one quantity of reactants through a plurality of inlets such that the reactants combine within the combined reactants directed to the reaction zone. The Examiner has not asserted that this methodology is taught,

suggested or motivated by the combined teachings of the references. Therefore, prima facie obviousness has not been established.

Claims 39 and 40

Claims 39 and 40 are directed to product compositions that are solids within the methodology of claim 38 involving the formation of a **mixture** of product compositions. The Acosta patent is directed to the formation of liquid mixtures for analysis while the Marsh patent is directed to the formation of solid inorganic powders. The Examiner has not reconciled the combination of these disparate methodologies in the Marsh patent and the Acosta patent. Furthermore, neither cited patent teaches the formation of a product mixture. Therefore, the Examiner has not asserted a case for prima facie obviousness of these claims.

Claim 61

Claim 61 depends from method claim 58. Claim 61 specifies that the claimed method is performed with an apparatus that has a nozzle that moves relative to the collectors. The Examiner has not explained how the analysis arrangement of the Acosta patent can be combined effectively with the methodology of the Marsh patent. These are disparate technologies with disparate purposes. Even if arguendo the Examiner had asserted an appropriate combination of the methodologies, there would be no reasonable expectation of success. Clearly, the combined teachings of the cited references do not render Applicants' claimed invention prima facie obvious.

Summary

The Examiner has not asserted a case for prima facie obviousness of any of method claims 1-7, 10, 12-14, 39-44 and 61. Therefore, the rejection of these claims over the combined teachings of the Marsh patent and the Acosta patent should be withdrawn.

CONCLUSIONS AND REQUEST FOR RELIEF

Applicants submit that claims 1-14 and 38-68 are in condition for allowance. Thus, Applicants respectfully request the reversal of the rejections of claims 1-14, 38-54, 56-61 and 63 and the allowance of the application.

Respectfully submitted,



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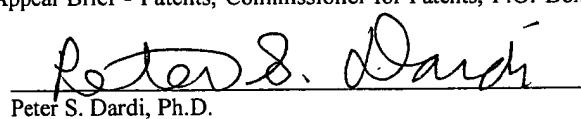
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Peter S. Dardi, Ph.D.

APPENDIX 1  
PENDING CLAIMS

1. A method for obtaining a plurality of quantities of compositions with an apparatus comprising a plurality of collectors and a nozzle comprising a reactant inlet, the method comprising:

reacting a first quantity of fluid reactants within a fluid stream at least a portion of which is from the reactant inlet to form a first quantity of product composition;

collecting the first quantity of product composition from the fluid stream using a first collector;

moving the nozzle relative to the first collector and second collector following completion of the collection of the first quantity of product composition;

following completion of the collection of the first quantity of product composition, reacting a second quantity of fluid reactants within the fluid stream at least a portion of which is from the reactant inlet to form a second quantity of product composition, the second quantity of product composition being materially different from the first quantity of product composition; and

collecting the second quantity of product composition from the fluid stream using a second collector along a flow path independent from the first collector.

2. The method of claim 1 wherein the composition of the second quantity of fluid reactants is different from the composition of the first quantity of fluid reactants.

3. The method of claim 1 wherein a reaction condition during the reaction of the second quantity of fluid reactants is different from the reaction condition during the reaction of the first quantity of fluid reactants.
4. The method of claim 3 wherein the reaction condition is selected from the group consisting of pressure, reactant flux, reactant temperature, amount of inert diluent, amount of radiation absorbing gas, and energy input.
5. The method of claim 1 wherein the nozzle comprises a plurality of reactant inlets.
6. The method of claim 1 wherein the nozzle remains fixed and the collectors are moved relative to the nozzle.
7. The method of claim 1 wherein the collectors remain fixed and the nozzle is moved relative to the collectors.
8. The method of claim 1 wherein the apparatus has a radiation path defined by a radiation source and directing optical elements and wherein the reacting of the fluid reactants involves interacting radiation from the radiation source with the reactants.
9. The method of claim 8 wherein the radiation source is an infrared laser.
10. The method of claim 1 wherein the reactions are performed in a reaction chamber sealed from the ambient environment.
11. The method of claim 10 wherein the compositions comprise particles and the apparatus further comprises a pump and valves, and wherein the valves are opened and

closed such that the first collector is exposed to the forces of the pump while the first quantity of particles are being collected and the second collector is exposed to the forces of the pump while the second quantity of particles are being collected.

12. The method of claim 1 further comprising evaluating the properties of the first quantity of product composition and the second quantity of product composition.

13. The method of claim 1 wherein one of the quantity of reactants is introduced into a reaction zone through a plurality of inlets oriented such that the reactants combine after they pass through the inlets, the reaction of the one quantity of reactants taking place within the reaction zone.

14. The method of claim 1 further comprising delivering the first quantity of reactants through a first nozzle and delivering the second quantity of reactants through a second nozzle.

15-37. (Canceled)

38. A method for producing a mixture of compositions, the method comprising:  
reacting a first quantity of fluid reactants to form a first quantity of product composition;  
collecting the first quantity of product composition using a collector;  
following completion of the collection of the first quantity of product composition, reacting a second quantity of fluid reactants to form a second quantity of product composition, the second quantity of product composition being materially different from the first quantity of product composition; and

collecting the second quantity of product composition using the collector to obtain a mixture of the first quantity of product composition and the second quantity of product composition,  
wherein the reactions are performed in a reaction chamber sealed from the ambient environment.

39. The method of claim 1 wherein the first quantity of product composition and the second quantity of product composition comprise solid particles.
40. The method of claim 1 wherein the first quantity of product composition and the second quantity of product composition comprises a metal.
41. The method of claim 1 wherein the first quantity of product composition and the second quantity of product composition comprises chemical powders selected from the group consisting of metal/metalloid oxides, metal/metalloid carbides, metal/metalloid nitrides, and metal/metalloid sulfides.
42. The method of claim 1 wherein the first quantity of fluid reactants and the second quantity of fluid reactants comprise vapor reactants.
43. The method of claim 1 wherein the first quantity of fluid reactants and the second quantity of fluid reactants comprise aerosol reactants.
44. The method of claim 1 wherein first quantity of fluid reactants and the second quantity of fluid reactants comprise a metal/metalloid compound.

45. The method of claim 12 wherein the step of evaluating the properties comprises evaluating the crystal structure by x-ray diffraction.

46. The method of claim 12 wherein the step of evaluating the properties comprises evaluating particle size using dynamic light scattering.

47. The method of claim 12 wherein the step of evaluating the properties comprises evaluation of the optical properties.

48. The method of claim 47 wherein the optical properties are selected from the group consisting of emission, absorption, Raman scattering, fluorescence and combinations thereof.

49. The method of claim 12 wherein the step of evaluating the properties comprises measurement of the electroactive properties.

50. The method of claim 12 wherein the step of evaluating the properties comprises measurement of the electrical properties or magnetic properties.

51. The method of claim 12 wherein the step of evaluating the properties is performed without removing the products from the collectors.

52. The method of claim 12 wherein the step of evaluating the properties is performed after removing the products from the collectors.

53. The method of claim 38 wherein the composition of the second quantity of fluid reactants is different from the composition of the first quantity of fluid reactants.

54. The method of claim 38 wherein the reacting the first quantity of fluid reactants is within a fluid stream and wherein the reacting the second quantity of fluid reactant is within a fluid stream.

55. The method of claim 38 wherein the apparatus has a radiation path defined by a radiation source and directing optical elements and wherein the reacting of the fluid reactant involves interacting radiation from the radiation source with the reactants.

56. (Canceled).

57. The method of claim 38 further comprising evaluating the properties of the mixture.

58. A method for obtaining a plurality of quantities of compositions with an apparatus comprising a plurality of collectors and a reactant delivery system comprising a first quantity of fluid reactants and a second quantity of fluid reactants being different from the first quantity of fluid reactants, the method comprising:

reacting the first quantity of fluid reactants within a fluid stream to form a first quantity of product composition;

collecting the first quantity of product composition from the fluid stream using a first collector;

following completion of the collection of the first quantity of product composition, reacting the second quantity of fluid reactants within the fluid stream to form a second quantity of product composition, the second quantity of product composition being materially different from the first quantity of product composition, wherein the second

quantity of fluid reactant is different from the first quantity of fluid reactants; and

collecting the second quantity of product composition from the fluid stream using a second collector.

59. The method of claim 58 wherein the first quantity of fluid reactants comprises a different proportion of compounds relative to the second quantity of fluid reactants.

60. The method of claim 58 wherein the first quantity of fluid reactants comprises different compounds than the second quantity of fluid reactants.

61. The method of claim 58 wherein the apparatus comprises a nozzle comprising a reactant inlet that moves relative to the plurality of collectors and wherein the nozzle is moved relative to the first collector and second collector following completion of the collection of the first quantity of product composition, at least a portion of the first quantity of fluid reactants being from the reactant inlet and at least a portion of the second quantity of second fluid reactants being from the reactant inlet.

62. The method of claim 58 wherein the apparatus has a radiation path defined by a radiation source and directing optical elements and wherein the reacting of the fluid reactants involves interacting radiation from the radiation source with the reactants.

63. The method of claim 58 further comprising evaluating the properties of the first quantity of product composition and the second quantity of product composition.

64. A method for obtaining a plurality of quantities of compositions with an apparatus comprising a plurality of collectors and a reaction chamber isolated from the ambient environment, the method comprising:

reacting in the reaction chamber a first quantity of fluid reactants within a fluid stream to form a first quantity of product composition;

collecting the first quantity of product composition from the fluid stream using a first collector;

following completion of the collection of the first quantity of product composition, reacting in the reaction chamber a second quantity of fluid reactants within the fluid stream to form a second quantity of product composition, the second quantity of product composition being materially different from the first quantity of product composition, wherein at least one reaction condition during the formation of the second quantity of product compositions is different from the reaction condition during the formation of the first quantity of product compositions and wherein the reaction chamber remains isolated from the ambient environment continuously from the reacting of the first quantity of reactants and through the reacting of the second quantity of reactants; and

collecting the second quantity of product composition from the fluid stream using a second collector.

65. The method of claim 64 wherein the at least one reaction condition is selected from the group consisting of pressure, reactant flux, reactant temperature, amount of inert diluent, amount of radiation absorbing gas, and energy input.

66. The method of claim 64 wherein the apparatus comprises a nozzle comprising a reactant inlet that moves relative to the plurality of collectors and wherein the nozzle is moved relative to the first collector and second collector following completion of the collection of the first quantity of product composition, at least a portion of the first quantity of fluid reactants being from the reactant inlet and at least a portion of the second quantity of second fluid reactants being from the reactant inlet.
67. The method of claim 64 wherein the apparatus has a radiation path defined by a radiation source and directing optical elements and wherein the reacting of the fluid reactants involves interacting radiation from the radiation source with the reactants.
68. The method of claim 64 further comprising evaluating the properties of the first quantity of product composition and the second quantity of product.

APPENDIX 2 - U.S. Patent 4,649,037 to Marsh et al.

Appendix 3 - U.S. Patent 6,254,826 to Acosta et al.